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AMERICAN DYESTUFF REPORTER

A Weekly Publication devoted to

DYESTUFFS, COLORS and ALLIED CHEMICALS

"Circulated Everywhere Dyestuffs are Used"

Vol. 2 New York, March 25, 1918 No. 8

War Trade Board Places Limit on Imports

WAR TRADE BOARD experts predict the restriction of imports on the articles listed, will save 1,500,000 tons of shipping a year, reckoning on a deadweight cargo basis. The saving may be higher, they say, because several of the commodities are bulky and take up more ship space than others. The saving on metals will be about 600,000 tons.

In this connection, it is noted that the board feels confident the War Department will be able to find enough iron pyrites in this country to maintain the sulphur supplies urgently needed in munitions making.

The War Department has been working for months to develop new pyrites fields for the sake of the sulphur and sulphuric acids dependent on pyrites. No high explosive can be made without this acid, of which there has been a shortage. Last year about 207,000 tons of pyrites were imported from Spain and elsewhere. Probably 125,000 tons will be imported before October 1, this year, after which importation will be cut off completely.

The following is the list of restricted imports. No. 1:

NOTE: *This list contains many products in which the mills are not interested, consequently they are not mentioned. The products that do interest are the following:*

All acids, muriate of ammonia, all coal tar distillates except synthetic indigo: fusel oil or amylic alcohol, citrate of lime; all salts of soda except nitrate of soda and cyanide of soda; sumac, ground or unground; artificial silk, non-mineral paints and varnishes.

American concerns seeking to import any of these articles will have to submit their applications to a rigid inspection. The applications will not be granted except under these circumstances:

"1. When the articles are actually shipped from abroad prior to April 15, 1918.

"2. When coming by rail from Mexico or Canada, when the goods originated in those countries or in others from which such goods are being licensed for import.

"When coming as a return cargo from European points and then only (a) when coming from a convenient port; (b) when loaded without delay and (c) when the importation from Europe is not specifically prohibited in said list."

In further explanation of the procedure to be followed, an official statement, issued to-night, says:

"In the future, therefore, applicants for licenses to import articles mentioned in the list will be obliged to show in their application the exis-

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Bordeaux B—Crimson Y
Bordeaux 2BX—Tartrazine
Nigrosine

CHROME COLORS
Alizarine Yellow GG
Chrome Yellow G
Meta Chrome Brown
Alizarine Orange R

BASIC COLORS
Methylene Blue—Methyl Violet

DIRECT COLORS
Orange R—Maroon Red—Red
Chrysamine—Violet R
Fast Yellow R

LAKE COLORS
Lake Scarlet 2R—Lake Scarlet 2RX
Acid Orange—Bordeaux B
Methylene Blue—Methyl Violet

INTERMEDIATES

Nitro Benzol, Commercial
Nitro Benzol, Redistilled
(Oil of Myrbane)
Aniline Oil, Aniline Salt
Dimethylaniline, Dinitro Benzol
Metaphenylenediamine
Beta Naphthol, Sulphanilic Acid
Naphthionic Acid, Nitro Xylol
Xylidine, Paranitraniline
Salicylic Acid

In addition to the above we manufacture limited quantities of other intermediates for our own consumption. Also we are developing other items for our own use and on a large scale for the market. On this account we shall be glad to have inquiries from our customers for intermediates not listed above, and we will advise our position on same.

THE CALCO CHEMICAL COMPANY
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Branch Offices
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Philadelphia
Cincinnati

General Sales Offices
44th Floor Woolworth Building
New York

Branch Plants
Burlington, N. J.
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Somerville, N. J.

tence of such of the facts above outlined as will warrant the granting of such licenses. In the case of shipments from European points, the most satisfactory evidence will be proof that shipping space has been actually engaged. The present form of application for import license will generally be found adequate for this purpose, and where this is not found to be the case, a letter setting forth the additional facts should accompany such application.

"United States Consuls have been instructed not to issue consular invoices on and after April 15, 1918, for the articles mentioned in the list without first being furnished with the number of the import license or being given other evidence of the issuance of such license. Shipping agencies are also advised not to accept for shipment consignments of the articles mentioned in the list without similar evidence of the issuance of the import license. This applies only to the articles mentioned in the list. No proof of the issuance of the import license for articles not so mentioned is to be required either by consuls before issuing consular invoices, or shipping agencies in accepting freight. It will devolve upon importers, therefore, to advise their shipper abroad by letter or cable, of the number of their import license so that such shipper will be able to furnish the same to the consuls and the shipping agencies. This will mean that importers must be communicated abroad in ample time.

"It should be borne in mind by importers that the publication of this list in nowise relieves them of the necessity of applying for license to import articles not on the list, as all commodities require an import license except such as are now permitted to be imported under general licenses."

Statement Regarding Dyestuffs Association.

The following statement was issued by Benjamin M. Kaye, attorney for the Dyestuffs Manufacturers Association:

"The Board of Governors of the American Dyestuffs Manufacturers, who were elected at the meeting of the proposed association held on March 6th, at the Chemist Club, New York City, held their first meeting on Tuesday, March 19th, at the office of their counsel, Benj. M. Kaye.

"Formal resolutions were adopted providing for the filing of a Certificate of Incorporation in the State of New York under the name of 'American Dyestuff Manufacturers Association.'

"A committee of three was appointed, consisting of Frank Hemingway of Frank Hemingway, Inc., Dr. J. Merritt Matthews of the Grasselli Company, and Elvin H. Killheffer of the Newport Chemical Company, to work out the details of the Certificate of Incorporation, Constitution and By-Laws.

"The general principle was again annunciated that this is to be a thoroughly American Association, consisting of American manufacturers working with American capital and

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doing their manufacturing in America.

"The Board of Governors is to meet again at the office of its counsel on Friday, March 29th, for the purpose of adopting a final form for its Constitution and By-Laws, after which it will proceed rapidly with its activities in establishing the Dyestuff Industry firmly in this country."

Mr. Kaye stated that at the meeting to be held on March 29th, permanent officers will be elected.

Calco Chemical Company Absorbed by Marden, Orth & Hastings Co.

The Marden, Orth & Hastings Corporation, manufacturers of chemicals, tanning materials and oils, has recently obtained control of the Calco Chemical Company, a $7,000,000 corporation of New Jersey with sales headquarters in New York City. The Calco Company was incorporated in 1916 and is engaged in the manufacture of dyestuffs, intermediates and other chemicals at their plant in Bound Brook, N. J.

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INCORPORATED
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Synthetic Indigo Plant Now Being Erected by the National Aniline & Chemical Company, Inc.

This plant, it is claimed, intends to cover at least half the requirements of the United States. Much of the equipment is now on the ground and is in course of erection. The buildings are now mainly completed. A few months hence it should be possible to undertake contracts for specific deliveries. The development of this important chemical industrial problem has been coordinated under the direction of Dr. E. S. Johnson of the Semet-Solvay Company, and Dr. Robert M. Strong, Chief Works Engineer of the Marcus Hook plant of the National Aniline & Chemical Company. When the European War broke out and the supply of indigo (an essential staple of the American textile colorist) was threatened with elimination, the General Chemical Company, The Barrett Manufacturing Company, and the Semet-Solvay Company, recognizing the chemical catastrophe represented by the lack of indigo, entered upon its cooperative development. Research men from each organization were delegated to conduct the necessary experimental investigations, and about eighteen months were consumed before, in the matter of quality and yields, the product of the great German plants had been equalled. A semi-commercial operation is now producing small quantities of indigo, in connection with the extensive installation which is under way at Marcus Hook.

Inquiry Department

AMERICAN DYESTUFF REPORTER:

How can Azo Fuchsine be dyed on silk?

It is evident that you have been having difficulty in getting this dye to exhaust. The reason is simple—this is one of the few acid dyes that have so little affinity for silk that in wool goods with silk stripes the silk is left white. It is not considered a very practical dye for silk on this account but, if you must use it, use Formic acid in liberal

amount and give in plenty of time and heat. The dye will wash off easily and it would be better to select some other coloring matter that has a better affinity for silk.

AMERICAN DYESTUFF REPORTER:

Is there any difference between the Benzo, Chicago and Diamine sky blues?

There are several types of each which differ in brilliancy. All 6B blues are not identical, but seem very close matches in shade. The corresponding types of each factory are identical, but not with the other types.

AMERICAN DYESTUFF REPORTER:

When an Olive Drab dyed for Government goods turns reddish in the soap and soda test what is the reason?

There may be two reasons for this. Either the black or blue used for shading was not fast or some vegetable extract was used to obtain the yellow tone. Observe the soap liquor and if it is tinted blue or violet the blue dye is the probable cause of the trouble. If the soap liquor is untinted and if the proper color returns after soaking in acetic acid the yellow may be suspected. All the vegetable extracts turn reddish and are forbidden at present. They are generally quite fast in other respects and there is no reason to object to them. If the regulations permitted their use many mills would use them more extensively than at present.

AMERICAN DYESTUFF REPORTER:

Is it possible to remove the indelible ink used by laundries for marking linen?

The laundries themselves use liquids sold for this purpose. They usually consist of two liquids, the first a mixture of Aniline oil, Phenol and Acetone. The second is a solution of soap in Denatured Alcohol. The mark is soaked in the first liquid for about ½ hour and then wrung out and before becoming dry the second liquid is applied and immediately followed by a washing in warm water and soap. The first liquid dissolves the coloring matter but is not easily soluble in water. The second liquid combines with what is left of the first liquid and puts it in a condition to form an emulsion with soap and water. The dyestuff being loosened is then easily washed out. This process will not answer for ordinary ink or many other stains, but it quite efficient for Spirit blacks and basic dyes in general.

AMERICAN DYESTUFF REPORTER:

What is the distinction between a blue black and a jet black and which is more economical to use?

All the straight dyes that are sold as blacks are either blue-blacks, green-blacks or violet-blacks. In full shades the blue-blacks are most pleasing for some unaccountable reason. As the quantity of dye necessary to make a full shade is greater, according to the brilliancy of the black, it has been found profitable to make jet blacks by destroying the brilliancy by the addition of reddish orange. A jet black in full shades has no overtone, and in pale shades is neutral grey. For piece goods an overtone is desirable, but for stripes and black and white mixtures depth is the main consideration. Hats are generally jet blacks as is also leather. Any attempt at making a jet

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CHROME BROWN

Phosgene Gas Michlers Ketone
Dinitrobenzol Benzyl Chloride
Picramic Acid Salicylic Acid
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LAKE COLORS ANILINE COLORS
PHARMACEUTICALS
OILS AND GREASES
ACIDS

black which oversteps the mark and gives yellowish or reddish overtones is quite unsightly and often bronzy.

AMERICAN DYESTUFF REPORTER:

How can I tell whether a direct pink is a true pink or only a reduced red dyestuff?

There is no distinction between a pink and a weak red providing the tone of the color is correct. With dyes like Erika, Brilliant Geranine, Diamine Rose and Rhodamine they have been regarded strictly as pinks and seldom used as full shades because their brilliancy made them more useful in pale shades. When full brilliant shades were required it was found that less expensive and less brilliant reds would give practically as good results. A brilliant bluish red, when reduced, is a pink or rose but if it has not a full degree of brilliancy the tone will be dull and slaty. Any given dye may be identified and its proper name discovered but there is no distinction as to which shall be designated as reds and which are pinks.

Fast Black on Cotton Hosiery.

Gentlemen:

I am enclosing an article that appeared in the March issue of "The Dyer and Calico Printer" which, I hope, will help those mills that are responsible for some of the hosiery we from time to time receive. Happily most of the goods we export is well dyed, but there are a few exceptions. We know that good blacks are now being manufactured in this country, and if these dyes are used no trouble should be encountered.—Export Agencies.

FAST BLACK ON COTTON HOSIERY

Notwithstanding the many blacks that have been produced during the past twenty years that were claimed to possess the same shade and other properties of aniline black or fast black, the fact remains that a properly dyed aniline black is still regarded as the standard against which all other blacks dyed upon cotton are compared and judged.

Aniline black dyeing is essentially a trade by itself, and to acquire pro-

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ficiency and skill in it demands long practice, painstaking care, and close observation of details. It should be remembered that fast black dyeing is not a matter of recipes or formula, but of knowledge gained by actual experience over the dye kettle.

Formula can only serve as a guide, and when thoroughly digested and understood, will serve as an intelligent starting point for a dyer to proceed with the work, and in no other class of dyeing is this more apparent than in dyeing hosiery.

The following details for fast black dyeing with aniline oil and aniline salt are known to have been the actual working formula in a dyehouse in Germany, which was noted for the excellence of its output. It is not known at this time whether this particular dyehouse is in operation, but the probability is that it is idle.

Preparation of Goods

Careful preparation of the stockings to be dyed is one of the most important preliminary operations, since, without some sort of treatment of the materials to be dyed before actual entry into the dye baths, there is every possibility that the shade will not be even, or the color not fast, and fastness is the crucial test for aniline blacks.

The stockings are boiled in a sufficient volume, usually 300 gallons of water for each 100 lb. of hosiery. In this water is dissolved 5 lb. of soda ash. Boiling continues for one to one and a half hours. This alkaline boil dissolves and removes oils, and other fatty or waxy substances always present in the cotton. The goods are afterwards rinsed in two changes of clear water to remove the excess of soda, and then immersed in a tub of acidified water containing about 1½ gallons of acetic acid for 100 lb. of stockings. The temperature of this latter bath is maintained at a moderate degree, say, a good hand heat. The object of this treatment is to neutralize all the soda that is mechanically held by the cotton. From this weak acetic acid bath, the stockings are lifted and thrown on to a grill and allowed to drain for some time, and then they are whizzed, and hung until dry in a dryroom at a temperature of 130 deg. F., which usually requires overnight.

Preparing the Solution

The dyeing is carried out in several stages. There is first prepared the aniline oil mixture, consisting of 40 lb. of aniline oil dissolved with 40 lb. of hydrochloric acid, standing at 28 deg. Tw., and thoroughly mixed together in a large stoneware crock. The temperature rises rapidly during the mixing, but it is stirred from time to time until it has dropped to about 70 deg. F.

In the meantime, there has been prepared separately a solution of 40 lb. aniline salt dissolved in 18 to 20 gallons of water. When both solutions are about the same temperature, they are mixed and well stirred. To this solution there is added one made with 40 lb. of chlorate of soda in 16 gallons water. This makes the stock solution for the actual dyeing.

The oxidizing solution, which is prepared with some degree of accuracy, consists of 12¾ lb. of clean, bright bluestone; 10½ ounces of bichromate of potash, and 1½ lb. of oil of vitriol which has been previously diluted with water to stand at 6 deg. Tw.

The Dyeing Plant

The impregnating or saturating of the stockings is carried out in large wooden troughs, into each of which is placed the mixed solution of aniline, etc., diluted with water to stand at 12 deg. Tw., and ½ gallon of the chrome-copper solution; the whole being well mixed.

The impregnating troughs used are built similar to bath tubs, but without a sloping end, they have, however, a semi-cylindrical bottom, which permits the stockings to be better poled than if the bottom is flat. The writer has seen this work done, however, in rotary dyeing machines of the ordinary type common in many American dyehouses, and with excellent results.

(*Continued on page* 9)

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MYRON DREW REESER, Managing Editor

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A Suggestion Regarding Dyestuff Samples

A short time ago there was a discussion regarding the value of dye tests in general. It had been noticed that two lots of Direct Brown tested at different times differed both in shade and strength and some doubt was expressed as to whether one or the other represented the true conditions. The owner of the goods asserted that both samples came out of the same bottle so it was evident that there was a blunder somewhere.

The chemist who made the tests was questioned and was asked to make a further report. The findings showed that the brown contained Congo Red, Chrysamine and Direct Black—a very common mixture at this time. Any acid turned the Congo Red into a blue. The Chrysamine was turned orange by weak alkalies and yellow again by acids. The Black turned violet with acids and greenish with alkalies. Even the breath was able to change the shade of a fresh dyeing. The facts were demonstrated to the man who had made the complaint but he was not convinced that he had not received a fair test. Further conversation with the chemist brought out the fact that complaints of similar nature were quite common but, instead of having the trouble investigated, it was customary to question the accuracy of his work. He then showed us several samples of dyes that had been reduced from the original type. They were composed of powdered color and salt mixed with lumps of strong color and lumps of salt. He stated that when he made a test it was necessary to grind the whole sample to a uniform powder but this did not guarantee that the whole sample did not represent either an excess of strong color or salt. The sample only needed to be tapped on a table a few times when the salt would collect on top and the color would pack together at the bottom. It is easy to imagine a keg of such dye travelling on a truck over a rough road and then being sampled through a hole bored in the top or the bottom. A lawsuit might easily result by comparing the results of the two samples taken from the same package.

It was suggested that many of these misunderstandings could be avoided by selecting samples with more care. Mixtures made with sensitive or slowly exhausting colors were always a source of trouble. Very much reduced dyes would always dye uneven in light shades and the use of Acid Blacks for shading mixtures would prove a disappointment. It is always possible to force any mixture to do its best providing one knows its composition. When such a combination is tested blindly by a routine method all the defects will appear. This is really an advantage because the points that come out will be those that the dyer will object to and most people like to know beforehand what objections are likely to be made.

We noted that the task of deciding dyestuff controversies impartially was no sinecure. It is always so, even in a court of justice, for when the judge renders a decision, one party remarks "Oh admirable judge," while the other remarks "He is kept on the bench by politics." In every case there is bound to be a loser and a winner and it is doubtless very unpleasant for the one who makes the decision to hear the groans of the loser.

It has been suggested that in all cases where dyestuff controversies are to be decided by test to submit three or four samples lettered at random A, B, C, and D. This allows two of each and eliminates entirely any personal element.

When anything seems irregular it is best to have it investigated, for the very reason of the irregularity may be worth knowing.

We personally believe that every dyestuff dealer, manufacturer and consumer should have at least a small equipment for making his own tests and familiarize himself with every dye he handles. This view is shared by those who make a business of testing because they know that there will still be enough controversies to keep them busy but the work will be easier to handle when everyone knows the requirements.

Fast Black on Cotton Hosiery

(*Continued from page 7*)

The common tomtom, familiar in some localities, is also most admirably adapted for this work.

The trough (or dyeing machine) being properly filled, the dry stockings, previously weighed out in equal sized lots, are quickly immersed with the aid of the pole, and slowly moved about for about half-an-hour; longer is not necessary. Wetting out with the dye solution proceeds quickly and uniformly due to the preliminary treatment. From the trough, the stockings are taken to a draining rack overhead, and then to a whizzer, all liquors being saved and run back to the trough.

Details of Oxidation

When whizzed, the stockings are thrown out in heaps, where they are boarded carefully, and hung in the oxidizing chamber, which is kept uniformly heated to about 135 deg. F., for two hours. More rapid oxidizing-drying is found not to be advantageous; there being a possibility of incipient destruction of the cotton if too hurried oxidation is attempted.

After oxidation is completed, the stockings are removed from the boards, and then worked for about twenty minutes in a fresh bath, heated to 100 deg. F., containing from 2½ to 3 lb. of bichromate of potash in solution. This final treatment completes the oxidation commenced in the chamber, and causes the gradual development of the fast black. Indeed, this bichromte treatment may

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profitably proceed at a slower rate provided the dyer is content to operate commencing at a lower temperature, say, 80 deg. F., gradually raising it to 100 deg. F.

Washing and Softening

This practically completes the dyeing. The final operation consists of a thorough washing to remove the remaining traces of salts and acids, then finishing by applying a softener of which there is none better than a first class well made olive oil soap.

Some dyers have a formula of their own for fast black softener on hosiery which they use regularly, and with good results. These men are experienced, and know how to prepare their private formulae properly, but it is almost next to useless for any one without experience, and who has large batches of dyed hosiery coming on every day, to attempt to prepare the softener himself. His best results will, in such a case, be secured by buying the finish ready compounded.

There is to-day, a firm demand for fast black stockings. Stockings that will not wash to a slate or green shade. The writer has examined a number of stockings bought in the average run of stores, and from previous experience, this weakening of the shade is due to too hurried work in the dyehouse, and with a dye mixture that was not properly balanced.

No Statement Issued by Board of Governors

There has been no authorized statement issued by the committee engaged in forming the Dyestuffs Manufacturers' Association of America.

Such a statement will be issued to the Reporter the latter part of next week.—*Editor.*

Indigo Paste

Di Brom Indigo in paste form is being offered to dealers and consumers. While this is one of the vat dyes it differs only in shade from true Indigo. There has been a demand for such a product among the makers of

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. . . *Manufacturers of* . . .

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Chipped *and* Ground Dyewoods

Importers of

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ginghams and shirtings. The greatest drawback at present is the absence of solid Hydrosulphite on the market. Dyers can make their own Hydrosulphite from Sodium Bisulphite and Zinc dust but like to use the solid variety when they can get it. We await with interest the appearance of other vat dyes, especially the so-called fancy shades. It may be that Di Brom Indigo can be used in place of Indanthrene in tinting white paper. The shade is redder than Indigo and the fastness is equal to all requirements. The experiment is worth trying and there are many paper mills who have been asking for such a dye for some time.

Beam Dyeing

An Interesting New Invention

There is no standing still in any industry. The dyeing trade has been completely revolutionized every five years for the past twenty years. Perkin led the way when he showed us how to "copy nature," and all true invention is simply copying, or following nature; by restoring to us the beautiful colors nature gave us and stored away for us untold ages ago. Compact dyeing is no exception to the rule, and the dyeing trade has now for some time been much interested in following the efforts of experts to devise a successful method of Beam Dyeing. Among those who have been hard at work with this object in view must be named John, Edward and Thomas Brandwood, Managing Directors of The Elton Cop Dyeing Company, Limited, Bury, Lancashire, England, who, after continued effort since the foundation of their works in 1900 have, some little time ago, perfected a system of beam dyeing which, it is not too much to say, looks like revolutionizing the dyeing industry.

The world's population is demanding, and will demand better and faster colors in increasing variety. Not only must dyers now give all the best and fastest colors, but they must give them at the lowest possible cost, and this is why experts maintain mechanical dyeing must ultimately completely supersede the old and out-of-date methods, known as skein or chain dyeing, for not only is mechanical dyeing, in their opinion, the only possible way of getting perfect dyeing on a large scale, but it is the only one possible from an economic point of view. In beam dyeing, the liquor pump circulates the dye liquor through every particle and fibre of the yarn on the beam, and the air pump fixes the color and makes it good. The advantages of beam dyeing are held, now, to be such that it must, in time, take the place of every other way of coloring warp yarns on a large scale. John Brandwood sums up the principal advantages as follows:

1. The cost of beaming or dressing is entirely saved, which may be anything from one farthing per pound up to two pence ½s per pound, according to the quality, and counts of yarn being worked.

2. The cost of dyehouse labor is reduced to the very low rate of one-tenth of a half penny per pound where the plant can be kept running fairly continuously.

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3. The production from the loom is increased about ten per cent. because all the elasticity, and the full strength of the yarn is maintained.

4. The cost of dyeing materials is reduced, especially when working with indigo, indanthrene, hydron, helindone, algole, theoindigo, ciba, and other vat dyes, or colors, which are the fastest and most expensive colors at present known.

5. There is no streaky, or uneven dyeing, perfect penetration is secured, every particle of the fibre being equally permeated and not plastered on the outside as in chain dyeing. Faster and brighter colors are secured, there is no broken, or damaged yarn, no beaming room is needed, and not more than a quarter of the dyehouse room, finally easy and reliable matchings of dyeings are obtained.

These are such manifest advantages that the new method calls for the closest investigation, and consideration from dyers generally. Further, no drying cans are required, and a considerable saving in steam, water and power is effected, but there are certain essential requirements in a beam dyeing plant if it is to accomplish the above much-desired results. These may be said to be:

1. It must dye the whole set of beams of one color at one operation. For example, in a case in which, say, six beams of indigo blue are needed for a set of denims, or chambrays, the whole six beams must be dyed together at one operation, and the color must be even, and fast, that is perfect.

2. They must be equally suitable for all descriptions of colors, so that the same plant, with a modification of treatment, will dye equally well all classes of colors, whether vat colors, azolized, and developed colors, sulphur colors, or substantive colors, and dye each description of colors as economically as possible.

3. It must use a section beam of the usual size that will hold 300 pounds of yarn, and can be run in the warper, the dyeing apparatus, and in the slashing frame without trouble, and one that will last indefinitely.

These conditions fulfilled, it may be said, without hesitation, that the final problem has been successfully solved in dyeing warp yarns on a large scale, and that every manufacturer of colored goods on a large scale will before long have to adopt it, or retire from business. Beam dyeing is of no value to the manufacturer who uses little colored, and a great variety of colors in the manufacture of his goods. Take, for instance, a manufacturer of high-class shirtings. He will use a hundred colored ends maybe altogether and several colors in a piece of cloth. Beam dyeing is of no service to him for he could not use a beam, or even half a beam of one color in any cloth he makes. Here beam dyeing is obviously not suitable, or economical, but even he cannot go on in the old way. The course for him to adopt is to dye in a smaller way than the beam, that is in the cheese, or spool, and this course must recommend itself to him.

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Cheese dyeing offers sound advantages in economy of production, which make it a good business proposition. In carrying it out it is the practice to put the cheeses, or spools behind the slashing frame, and run along with the beams of gray yarn, and in this manner the unnecessary labor in beaming is cut out. There is, however, it must be pointed out, nothing like the saving effected as in beam dyeing for the cost of manipulation in dye house labor, dye materials, and steam is practically as great as in chain dyeing. Still the beaming is eliminated, which makes it the most economical manner of producing goods of this kind in which only a small minority of threads are colored.

The colored goods manufacturer who reads this article will want to know if it is possible, and practicable for the three essential requirements, just given, to be embodied in any beam dyeing plant, or apparatus, and if so, is such a plant already in existence. A plant of this kind has been at work in the United States, and Canada, now, for some time dyeing and bleaching over a quarter of a million pounds weekly, and reaping all the advantages already mentioned, and a plant is being installed for a further half million pounds weekly. Such being the case, every colored manufacturer will be only too pleased to have some little guidance as to what are the essential features in mechanical construction of such plant, and apparatus, and how such results are accomplished. It is claimed that the Brandwood system of Beam Dyeing is the only system possible by which the aforementioned results can be obtained because it combines the three essential principles necessary to secure perfect and satisfactory results:

The first essential principle is means for controlling the density, or hardness, of the beams. Every practical dyer knows how different qualities of yarn behave differently in the same dye bath, and how, also, different dyestuffs behave differently towards the same class of yarns. This knowledge can only be acquired by practical experience, and is not to be found in books. This is why it is easy to make beams so hard, or so soft, that it is impossible to dye same satisfactorily by any mechanical means. By the Brandwood system, it is possible to control the density or hardness of the beams at will by means of a simple and effective apparatus which can be attached to any warper. These attachments are made in the United States for the patentee under License by the Draper Corporation, Hopedale, Mass., to whom they have granted a Sole License in the United States for the manufacture of the same. This Density Controlling Apparatus can be fitted on to any make of warper.

Attempts have been made to accomplish the same results by partially collapsing the dyeing cylinder while the yarn is in process of dyeing, but all such attempts must necessarily be very poor makeshifts, indeed, compared with the Brandwood method of accomplishing this, and such methods mean a dyeing cylinder that is huge and cumbersome, also impracticable. Their dyeing cylinder is only the size

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and weight of an ordinary wood section beam, is equally suitable, alike, for the warping machine, the dyeing machine, and the slashing machine, and lasts a lifetime.

The second essential principle is that the beams must be dyed in the vertical position, in a closed chamber, at greater than atmospheric pressure. In no other way can uniform and satisfactory results be secured. Messrs. Brandwoods began many years ago by dyeing in a horizontal position, and followed this up by rotating the beams during the dyeing process. It was no use, and they were at last forced to recognize the inevitable, that no two things can occupy the same space at the same time, and nature makes no exceptions. A beam of yarn, no matter how lightly wound, is just as full of air as the atmosphere itself. It must, of course, be obvious that until all the air is removed it is impossible to impregnate the yarn evenly with dye liquor, and in attempting to dye in the horizontal position the upper part of the beam always forms a series of natural air pockets which it is impossible wholly to get rid of by any mechanical means. For this and other reasons, all attempts at dyeing beams in the horizontal position are foredoomed to failure. Further, dyeing in the vertical position enables any number of beams to be dyed together at one operation, renders mechanical means possible for quickly and automatically pulling the beams in position in the dyeing chamber, and just as quickly removing the same. A six beam dyeing chamber can be charged, or emptied in about five minutes. The above principle of dyeing beams in a vertical position (and the principle is a most important factor in obtaining successful results), in a closed chamber, and at greater than atmospheric pressure, together with the means of carrying the same into effect is Messrs. Brandwoods' invention, and is patented in the United States, and all industrial countries so that there is no possible way of dyeing a beam, or a whole set of beams at one operation evenly and uniformly throughout without the use of these patents.

The third essential principle is the fixing or developing of the color after dyeing by the application of air pressure from the outside to the inside of the beam. In the first plants Messrs. Brandwoods had working, vacuum was utilized, but even a perfect vacuum, if it could be obtained, is altogether inadequate for this purpose. Then they applied air pressure up the centre of the beam, which was found to be little better because the effective pressure

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was lost in its radiation outwards, and so the color was only partially fixed, the dyeing uneven, and a large quantity of dye liquor remained in the beam.

Their system is unique in that the air pressure is applied to the outside of the beam, and so the mean effective pressure is maintained all the way through the beam, and further, the whole set of beams are oxidized together at one operation, and all the moisture removed that is possible by mechanical means. This principle they have patented in the United States and all industrial countries, and it is the only sure method achieving perfect results, as well as being by far the most economical way. The color is therefore not only fixed and developed on the whole set of beams simultaneously, but the great bulk of the moisture removed, so that there is no need to dry them further before slashing, and if the beams are allowed to lie in the slashing room a few weeks before slashing, they will take no harm, but will just dry out naturally.

The dyeing cylinder is constructed in an ingenious manner, making it equally adaptable to the warper, the dyeing apparatus, and the slashing frame. It is made from metals that are in no wise affected by any chemical or dye liquors used in a dye house. It is no heavier or bulkier than an ordinary wood section beam. It holds 300 pounds of yarn and cannot get damaged by rough handling. It lasts a lifetime. This dyeing cylinder is filled in the ordinary way in the warper, but on the warper there is a simple but reliable attachment which enables the beam to be wound to any degree of hardness or density required for dyeing, for in beam dyeing as in any other method of dyeing, different qualities of cotton behave differently in the dye bath, and also different colors require different treatment. Hence the need for controlling the hardness or density of the beam. The attachment mentioned not only controls the density, but ensures its being uniform throughout the beam, so essential in beam dyeing. It is a single roller, covered with special material, which assists the yarn on its warp on to the beam by traveling at a greater surface speed than the yarn itself, or retards the yarn by traveling at a slower surface speed, as may be required. An arrangement of levers and clutch ensures the roller being out of action just before the beam stops and until just after it starts up. The speed of the roller can be readily adjusted. It is impossible to imagine any other way of accomplishing this object.

The dyeing apparatus itself is unique in that it may be constructed to dye any number of beams, the general rule being to dye the full number of beams or each set at one operation. The beams all automatically find their positions in the dyeing chamber, and are not taken out until they are finished and ready to go to the slasher. The dyeing is, of course, done in the vertical position in a closed chamber under pressure greater than that of the atmosphere and the apparatus can be immediately adapted so as to dye indigo, indanthrene, or any of the vat colors, azo, developed, and sulphur colors under the conditions most suitable for each dyestuff.

The deadlock in trying to dye beams in the horizontal position is that air pockets will form in the upper part of the beam and cannot be gotten rid of. If the beam is rotated during the dyeing operation, the air pockets just stay there and the result is patchy, spotted, and uneven dyeing. The space required when the dyeing is done in the vertical position is not one quarter of the space required for a chain dyeing plant of a similar capacity.

(*Continued in next issue*)

Brander, Bergstrom & Co., exporters and importers of chemicals from Buenos Aires, have recently opened a branch office at 141 Broadway, New York City.

Application has been filed by the Day Chemical Company, Chicago, for incorporation. The incorporators are James B. Day, Robert A. Heveenor, R. H. Clinton, Hilgard B. Young, and Ernest T. Stelle.

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